SEMESTER EXAMINATION DECEMBER-2023

Course Name: - B.Tech **Semester:- 1**

Paper Name: - Engineering Physics **Paper Code:- TBS101**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं सह लेखक परीक्षार्थियों के लिए। अधिकतम अंक–70

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र मे तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ मे प्रत्येक प्रश्न तीन अंक का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब मे **सात प्रश्नों में से किन्हीं पाँच** प्रश्नो के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स मे **तीन प्रश्नों में से किन्हीं दो** प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10 अंक** का है।

Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5x3 =15**

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) **As the speed of a particle approaches the speed of light, the mass of the particle-**

a) Increases

b) Decreases

c) Remains the same

d) Approaches Zero

ii) **In Young's double slit experiment if the slit separation is doubled. This result in**

a) An increase in fringe intensity

b) Decrease in fringe intensity

c) Fringe width will become half

d) Fringe width will become double

iii) **What happens to the de Broglie wavelength of an electron if its momentum is doubled?**

a) The wavelength decreased by a factor of 4

b) The wavelength increased by a factor of 4

c) The wavelength decreased by a factor of 2

d) The wavelength increased by a factor of 2

iv) **"A time-varying electric field produces magnetic field" This phenomenon is called-**

a) Gauss's Law

b) Kirchhoff Law

c) Hertz's Law

d) Ampere-Maxwell Law

v) **Which of the following is not a characteristic of LASERS?**

a) Coherent

b) Divergent

c) Monochromatic

d) Intense

Section – B (खण्ड–ब)
Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions in maximum 150 words. **5x7=35**
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. Discuss experimental evidence that shows time dilation is a real effect

ii. Give any five differences between interference and diffraction.

iii. Give the physical significance of wave function ψ.

iv. In Newton's ring experiment, the diameter of the 20th dark ring is 5.82 mm and the 10th ring is 3.36mm. If the radius of the plano convex lens is 1m, calculate the wavelength of light used.

v. Using the Heisenberg Uncertainty relation show that an electron cannot exist inside the nucleus.

vi. Give the Integral form of Maxwell's equation for EM waves and discuss its physical significance.

vii. Define the Acceptance angle and Numerical aperture and find expressions for them.

Section – C (खण्ड-स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. **2x10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) Discuss Michelson Morley Experiment. Find Expression for fringe width in the Michelson Morley Experiment and discuss its consequences.

ii) How Laser light is dissimilar from ordinary light? Give construction and working of Ruby Laser with a neat energy level diagram. Give some applications of Laser Light.

iii) What do you understand by Pointing Vector? State and prove the Poynting theorem.

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